CYTOLOGY OF *LEPTOGLOSSUS ZONATUS* (HEMIPTERA: COREIDAE)[1]

Richard J. Packauskas[2]

ABSTRACT: The diploid chromosome complement of *Leptoglossus zonatus* (Dallas) males is shown to consist of 21 chromosomes: 18 autosomes, 2 microchromosomes, and an X chromosome. There are two large homologous pairs (4-5 microns in length). The remaining autosomes and the X chromosome range from 2-3 microns in length, and the microchromosomes (which are round) are 1 micron in diameter. Major meiotic events of the species are briefly characterized.

The Coreidae is a very large and diverse family, and many species within it have been examined cytologically. Most coreids investigated have a pair of microchromosomes and an XO sex mechanism. The chromosomes are holokinetic (diffuse centromeric), as are those of all Hemiptera (Thomas 1987). Coreid chromosome numbers range from 2n = 13 to 2n = 28; the most common number is 2n = 21 (Ueshima 1979). The genus *Leptoglossus* Guérin belongs in the coreine tribe Anisoscelidini, some of whose members have been investigated cytologically (Piza 1945, 1956; Wilson 1907, 1909).

Here I examine the cytology of *Leptoglossus zonatus* (Dallas) and relate this to previous studies. The chromosome number of this species has never been published, nor have meiotic events in this genus been characterized.

MATERIALS AND METHODS

The figures and observations were based upon preparations made from 3 male fifth instars collected in Panama and alcohol preserved (70% ethyl) in August of 1987. A modification (Jane O'Donnell, unpubl.) of a technique (Ueshima 1963) for preparation of alcohol-preserved specimens was used with good results even after a year of storage: 1) testes were dissected out in alcohol and placed for 12 hours in the fixative isopropyl carnoy (3 parts pure isopropyl alcohol, 1 part glacial acetic acid); 2) they were transferred to glacial acetic acid and heated gently over an alcohol lamp for 5-10 minutes; 3) the preparation was allowed to cool to room temperature, and then placed in a drop of aceto-carmine; 4)

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[2]Department of Ecology and Evolutionary Biology, Box U-43, The University of Connecticut, Storrs, Ct 06268

a cover slip was applied and the material squashed with a few hard taps of a pencil eraser. All preparations were subsequently mounted in Diaphane to make them permanent (Sharma and Sharma 1972). Drawings were made with the aid of an ocular grid, and measurements with an ocular micrometer.

OBSERVATIONS

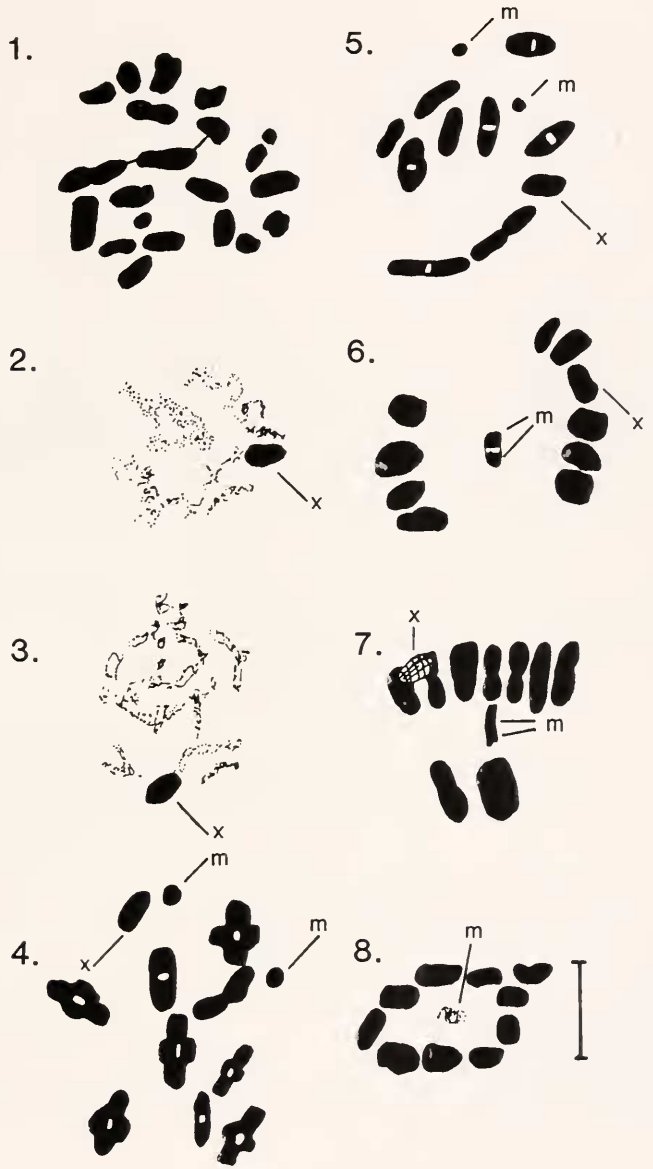
Observations were recorded as drawings; only brief explanatory comments are offered.

Spermatogonial phases are easily seen in *L. zonatus*, but these are not always easily analyzed. The spermatogonial chromosomes do not spread well in a squash and can only be counted in broken cells, but they are nevertheless useful in establishing a diploid count. Figure 1 is of a spermatogonial phase, and shows 21 chromosomes.

Prophase events are also not easily analyzed in the Heteroptera (Ueshima 1979), but are useful in establishing the size and shape of the sex chromosomes. Figures 2 and 3 clearly show a single heteropyconotic chromosome (the X chromosome).

Cells which are found in early diakinesis show chiasmata formation among the autosomes. Figure 4 shows terminalization of chiasmata among homologs of each of the autosomes. The microchrosomes (m) are plainly visible as the two smallest chromosomes. The X chromosome (x) can now be determined by comparison with Figures 2 and 3. Nine homolog pairs can be seen, as can the X chromosome and the two microchromosomes. Figure 5 shows late diakinesis, when terminalization of chiasmata is complete and the autosome homologs have reached their maximal lengths for this stage. This stage was the most useful in establishing a count. Thus, in *L. zonatus* we clearly see 9 pairs of autosomes, the X chromosome, and two microchromosomes, for a total of 21. Chromosomes were measured in 7 cells in late diakinesis. Two of the autosome homolog pairs were consistently larger than the rest, 4-5 microns in length. The remaining autosome pairs and the X chromosome were 2-3 microns in length, and the microchromosomes (which are round) were 1 micron in diameter.

In metaphase I (Figures 6 and 7), the autosome pairs and the X chromosome formed a ring around the two closely appressed microchromosomes. Finally, in a metaphase II (Figure 8), the same type of ring formed around the single diffuse microchromosome.



Figures: 1. spermatogonial phase, 2. prophase, zygotene, 3. prophase, leptotene = diplotene, 4. early diakinesis, 5. late diakinesis, 6. metaphase I, polar view, 7. metaphase I, lateral view, 8. metaphase III, polar view. m = michrochromosome, X = X chromosome. Scale bar = 5 microns.

DISCUSSION

Other species of *Leptoglossus* have been looked at cytologically, including *L. dilaticollis* Guerin (Piza 1956), *L. gonagra* (Fabricius) (Piza 1945), *L. phyllopus* (Linnaeus) (Wilson 1909), and *L. stigma* (Herbst) (Piza 1956). All have a diploid complement of 21 chromosomes in the male (18A + 2m + X). *Leptoglossus zonatus*, therefore, falls into this already established pattern.

These observations do not depart significantly from the more detailed description of meiotic events in *Coreus marginatus* L. (a member of the tribe Coreini) (Nokkala 1986); but the procedure and drawings herein should provide a novice entry into this neglected field of cytology. Only chromosome numbers were reported in all previous studies of this genus. It is hoped that the brief characterization of meiotic events within this species and the finding of disparate chromosome sizes will prove to be of value in further analysis of the cytology and the complex evolutionary history of this diverse and cytologically poorly known family.

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